INSECTS OF MICRONESIA
Diptera: Clusiidae

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INTRODUCTION

The Clusiidae in Micronesia have been known previously from only one species, *Czernyola atrifrons* Malloch, collected on Guam, Mariana Islands. Of the three species now reported for the first time from Micronesia, two are new: *Tonnoiria ponapensis* from Ponape, Caroline Islands; and *T. nigripalpis* from Saipan, Mariana Islands, also collected in Biak, N. W. New Guinea. The third species, *T. palliseta pleuralis* (Curran), is now known from the Carolines, Solomons, New Hebrides, Fiji, and North Queensland, Australia.

The authors express their gratitude to Dr. Paul H. Arnaud, Jr. for lending them the holotype of *Czernyola pleuralis* Curran in the collection of the California Academy of Sciences, San Francisco. All drawings are by M. Sasakawa.

The following symbols indicate the museums in which specimens are stored: BISHOP (B. P. Bishop Museum) and US (United States National Museum).

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Distributional List of Micronesian Clusiidae

1. Tonnoiria atrifrons: Guam, S. Mariana Islands.
2. T. ponapensis, new species: Ponape, Caroline Islands.
3. T. nigripalpis, new species: Saipan, S. Mariana Islands; other localities, Biak, N. W. New Guinea.

4. T. palliseta pleuralis: Truk, Kapingamarangi, Caroline Islands; other localities, Solomons, New Hebrides, Fiji, N. Queensland.

SYSTEMATICS

Genus **Tonnoiria** Malloch

Tonnoiria Malloch, 1929, Ann. Mag. Nat. Hist. X, **4**: 98.

Head with two reclinate upper fronto-orbital bristles, first pair distinctly shorter than second, rarely lacking, and two lower fronto-orbitals, first pair inclinate and situated as close to reclinate second lower fronto-orbitals as to second upper; postgenal bristle long. Mesonotum with two or three postsutural dorsocentral bristles, which decrease in length anteriorly; scutellum with two long apical bristles and two short lateral setae. Ultimate section of vein M_{1+2} four times as long as penultimate. Tibiae with preapicals. Male terminalia with surstylus conical, bearing two or more minute spines on ventral apex; cerci united with each other basally, bearing one or a few long apical setae; hypandrium U-shaped, with ventral transverse bar about two-thirds as long as sidepiece; praegonite and postgonite very long, united with hypandrium at both distal ends of sidepieces; phallapodeme very short, subequal to phallophore in length; phallus short, weakly sclerotized; ejaculatory apodeme not expanded terminally.

Malloch erected *Tonnoiria* for a single new species, *T. palliseta* from the Society Islands. He separated this genus from *Czernyola* on the presence of only two reclinate fronto-orbital bristles. In 1942, he described a new species, *Czernyola atrifrons,* from Guam, and synonymized *Tonnoiria* with *Czernyola.* Since then *Tonnoiria* has been cited as a synonym or, at best, a subgenus of *Czernyola* by recent workers.

Species of *Czernyola* (Neotropical) have three or four strong reclinate fronto-orbital bristles and only one postsutural dorsocentral bristle, whereas species of *Tonnoiria* (Asian and Australian) have two or three reclinate fronto-orbitals and two or three dorsocentrals.

It may be advisable to retain the name *Tonnoiria* for the Old World group, because of the differences shown above from the American forms and the wide geographical separation, until the authors have more proof that the groups are really congeneric.

From our studies of the specimens in the Bishop Museum and the U. S. National Museum collections and from the original descriptions, the following species are also considered to belong in *Tonnoiria*: *Czernyola biseta* Hendel (1913, Taiwan); *boettcheri* and *puncticornis* Frey (1928, Philippines); *puncticornis laetior* Frey (1960, Taiwan); and *australis, bisignata,* and *delta* McAlpine (1960, Australia).

Key to Micronesian species of Tonnoiria

1.	Female	2
	Male	5
2.	Mesonotum yellow with brown markings	**1. atrifrons**
	Mesonotum black	3

3. Thoracic pleura wholly black.. 4
   Pleura ventrally yellow...**2. ponapensis**
4. Second antennal segment dark brown; palpus dark brown; fore femur slightly brownish dorsoapically ....**3. nigripalpis**
   Second antennal segment orangish yellow; palpus yellowish brown; fore femur with distal one-half to three-fourths brown..............................**4. palliseta pleuralis**
5. Thoracic pleura wholly black..**3. nigripalpis**
   Pleura ventrally yellow..**4. palliseta pleuralis**

1. Tonnoiria atrifrons Malloch, new combination (fig. 1, *a*, *b*).

Czernyola atrifrons Malloch, 1942, B. P. Bishop Mus., Bull. **172**: 209.—Soós, 1962, Acta Zool. Hung. **8**: 455.

Female. Head black except for yellow triangular area on ventral half of frontalia, lateroventral one-third to one-half of postgena, face, and gena; parafrontalia slightly brown-tinged laterally; antenna yellow, upper margin of segment 3 testaceous, arista brown; palpus yellow. Thorax yellow, mesonotum with brown markings as figured, dorsal one-half to three-fourths of mesopleuron dark brown but not extending to anterior margin, pleurotergite brown. Bristles brown. Wing with pale-brown cloud on apical half; halter yellow. Legs yellow. Abdomen brownish black, ovipositor yellow.

Head: Front subequal to width of eye, slightly divergent ventrally; first upper fronto-orbital one-fifth to one-third length of second; gena about one-eighth height of eye. Antennae rather widely separated at bases; arista distinctly pubescent. Thorax: Mesonotum with 0 + 3 dorsocentrals, first dorsocentral about one-half length of second which is situated at middle between transverse suture and third dorsocentral, eight irregular rows of acrostichals, inner postalar one-fourth length of outer. Wing: Costa with three sections in proportion of 8.8: 2.6: 1.5, crossvein r-m beyond middle of discal cell (3-4: 2), ultimate section of M_{3+4} one-half to three-fourths length of penultimate.

Length: Body 2.55-3.0 mm.; wing 2.34-2.5 mm.

Male. Unknown.

DISTRIBUTION: S. Mariana Is. (Guam).

This species is quite specific in the yellow mesonotum with brown markings, differing from known Oriental species.

The holotype is in Bishop Museum, paratypes in US. National Museum.

2. Tonnoiria ponapensis Steyskal and Sasakawa, n. sp. (fig. 1, *c*).

Female. Head black except face and gena brown-tinged, parafrontalia and peristome brown, interantennal carina and parafacialia yellow; antenna yellow, segment 3 with brown apical margin; palpus brown. Thorax black except for yellow pleura and sternum below line from upper edge of fore coxa to posterior spiracle. Wing grayish brown, becoming hyaline posteriorly; halter yellow. Only one fore and one mid leg present; legs yellow, fore femur brownish dorsoapically, distal half of mid femur (except knee), and fore and mid tibiae (except extreme bases and apices) blackish brown. Abdomen brownish black, ovipositor yellow. All bristles except those of lower thorax brown to black.

Head: Front slightly wider than eye, broader ventrally; first upper fronto-orbital absent; postvertical slightly longer than ocellar. Thorax: Mesonotum with 0 + 3 dorsocentrals, first dorsocentral about one-half length of second. Wing: Second to fourth sections of costa in proportion of 6: 1.8: 1, crossvein r-m at distal one-third of discal cell, ultimate section of M_{3+4} two-thirds length of penultimate. Other structures are similar to those of *nigripalpis*, new species.

Length: Body 3.2 mm.; wing 2.7 mm.

Male. Unknown.

Holotype, female (US 68179), Mt. Dolen Nankep, 540 m., Ponape, Caroline Is., Aug. 11, 1946, Townes.

DISTRIBUTION: Caroline Is. (Ponape).

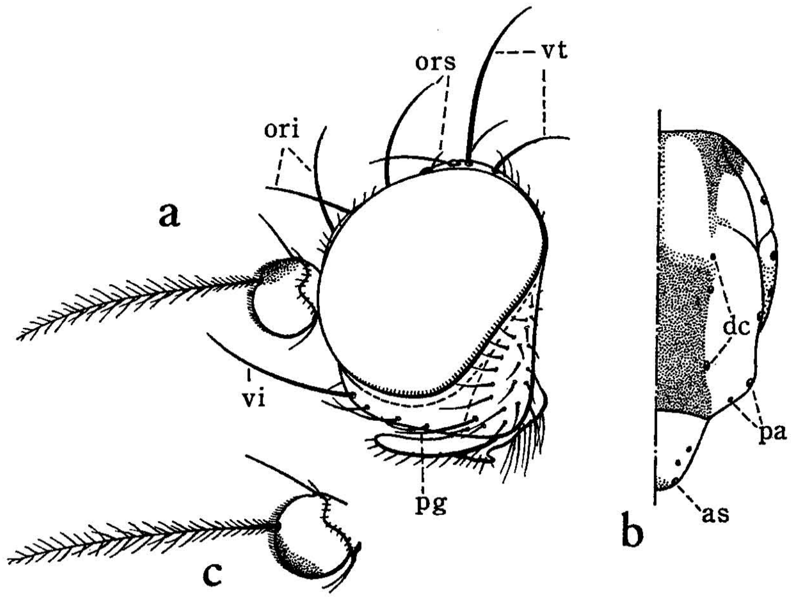


FIGURE 1.—**a, b,** *Tonnoiria atrifrons: a,* head in profile (ori, lower fronto-orbital bristles; ors, upper fronto-orbital bristles; pg, postgenal bristle; vi, vibrissa; vt, vertical bristles); *b,* right half of mesonotum and scutellum (as, apical scutellar bristle; dc, dorsocentral bristles; pa, postalar bristles). **c,** *T. ponapensis,* antenna.

The female of this species is readily separated from females of *T. nigripalpis* and *T. palliseta pleuralis* by the coloration of the thoracic pleura. The color of the fore leg of *ponapensis* is similar to that of the related species, but the apical band of the mid femur is much narrower.

3. **Tonnoiria nigripalpis** Steyskal and Sasakawa, n. sp. (fig. 2).

Male. Head black except face yellow, gena testaceous, and peristome brown, parafrontalia slightly brown-tinged; antennal segment 1 yellowish brown, 2 dark brown, 3 yellow and slightly brownish at base of arista, arista brown; palpus dark brown. Thorax black, humerus, propleuron, pteropleuron, and pleurotergite more or less tinged with brown, hypopleuron brown. Wing very slightly tinged with brown excepting basal part, darker on anterodistal half, veins pale brown, yellowish basally, calypter yellow, with margin and fringe testaceous; halter yellow. Legs yellow, fore coxa whitish, fore and mid femora brownish at dorsal apices, hind femur with brown ring on apical one-sixth, fore tibia brown dorsally, mid tibia slightly orangish and with brown ring on apical one-fifth, hind tibia brownish dorsoproximally and with brown ring on apical one-third. Abdomen brownish black, anterior tergites 1-3 and 6 with posterior margins

linearly yellowish, tergite 7 and epandrium dark brown, cercus yellow. Bristles and setae dark brown to black.

Head: Front slightly wider than width of eye, almost parallel-sided; first upper fronto-orbital about one-third as long as second, second lower fronto-orbital subequal to second upper, ocellar a little shorter than second upper fronto-orbital, postvertical two-thirds length of ocellar; eye height and width ratio as 3.8: 3.5; gena about one-seventh height of eye; vibrissa nearly twice as long as postgenal. Antennae narrowly separated at base, segment 3 shorter than wide, microscopically pilose, arista distinctly pubescent. Thorax: Mesonotum with 0 + 3 dorsocentrals, first dorsocentral about two-thirds as long as second which is situated midway between transverse suture and third dorsocentral, eight rows of acrostichals, six rows of them ending behind level of third dorsocentral, inner postalar one-fourth length of outer. Wing: Costal sections in proportion of 9: 2.5: 1.1, crossvein r-m beyond middle of discal cell (2.7: 2), ultimate section of M_{3+4} about three-fourths as long as penultimate. Terminalia: Surstylus two-thirds as high as epandrium, with two spines apically, cercus slightly wider than

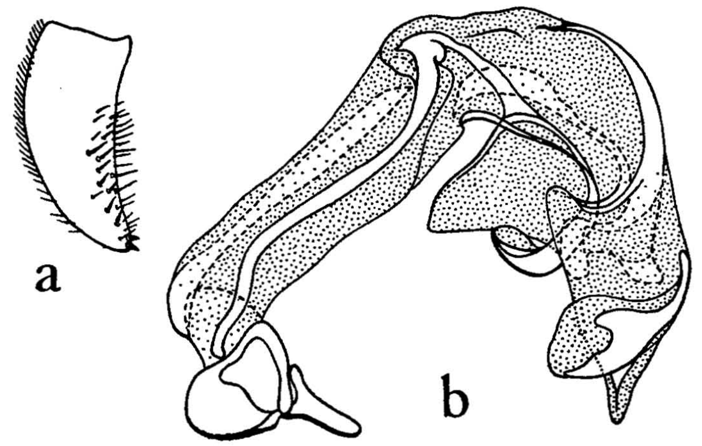


FIGURE 2.—*Tonnoiria nigripalpis*, male terminalia: **a**, surstylus, inner aspect; **b**, phallus, lateral aspect.

one-half of height; postgonite weakly sclerotized, with a long seta at middle and setulose apically; phallus as figured; ejaculatory apodeme 340 μ long.

Length: Body 2.68 mm.; wing 2.27 mm.

Female. Differs from male as follows: Parafrontalia brownish laterally, face yellowish brown, gena yellow and very slightly tinged with brown; antennal segment 3 with brown apical margin sometimes extending apically one-third on inner side; palpus darker; fore femur more or less brownish apically, distal four-fifths of mid femur and three-fifths of hind femur, and mid and hind tibiae excepting knees and distal apices brownish black; ovipositor yellow.

Front only a little narrower than width of eye, slightly broader ventrally; ocellar two-thirds length of second upper fronto-orbital; ratio of eye height and width as 4: 3; acrostichals extending just before scutellum; ultimate section of M_{3+4} only slightly shorter than penultimate (3: 2.5).

Length: Body 2.84-3.44 mm.; wing 2.30-2.54 mm.

Holotype, male (BISHOP 6727), Mangrowawa, 50-100 m., Biak I., Oct. 29, 1959, Gressitt. Allotopotype, female (BISHOP), May 31, 1959, Maa. Paratypes (BISHOP, US): Female, NE of air strip, 40 m., Kampong Land-

bouw, Biak I., July 16, 1957, Hardy; female, Tanapag, Saipan, on *Morinda citrifolia* leaf, Jan. 12, 1948, Maehler.

DISTRIBUTION: S. Mariana Is. (Saipan), N.W. New Guinea (Biak).

The male of this species differs from the Oriental *T. biseta* Hendel in the color of bristles on the head and thorax, and also from *puncticornis* Frey in the color of the fore coxa. The phallus of the present species is similar to that of *T. biseta* in general appearance, but in *T. biseta* the surstylus is provided with three spines and the ejaculatory apodeme is 132 μ in length. The female of *nigripalpis* is closely allied to *T. puncticornis laetior* (Frey) from Taiwan, but is readily distinguished by the color of the antenna and legs.

4. **Tonnoiria palliseta pleuralis** (Curran), new combination (fig. 3).
Czernyola pleuralis Curran, 1936, Calif. Acad. Sci., Proc. **22**: 54.
Czernyola palliseta pleuralis: McAlpine, 1960, Australian Mus., Rec. **25**: 79.—Soós, 1962, Acta Zool. Hung. **8**: 456.

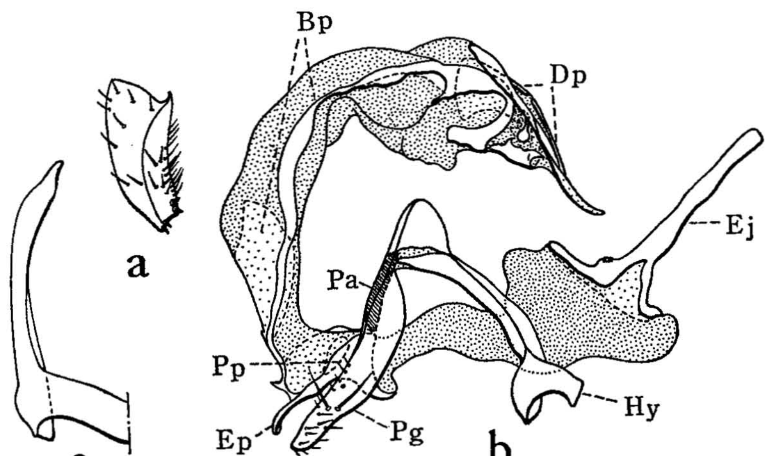


FIGURE 3.—*Tonnoiria palliseta pleuralis,* male terminalia: **a,** surstylus, inner aspect; **b,** phallus and ejaculatory apodeme, lateral aspect (Bp, basiphallus; Dp, distiphallus; Ej, ejaculatory apodeme; Ep, epiphallus; Hy, hypandrium; Pa, phallapodeme; Pg, postgonite; Pp, phallophore); **c,** right half of hypandrium, ventral aspect.

Male. Head black, frontalia with orangish spot on ventral one-third to one-half, parafrontalia testaceous to reddish, face, gena, and ventrolateral margin of postgena whitish to yellow; antenna yellow, segment 3 with pale brown spot just dorsad of base of arista; palpus yellow. Mesonotum and scutellum black but pleura dark brown, ventral one-third of mesopleuron, sternopleuron, and hypopleuron yellow, pteropleuron pale brown. Wing fuscous on apical two-fifths; halter yellow. Legs yellow, hind femur somewhat brownish on apical one-fifth to one-sixth. Bristles, except those of abdomen, yellow to brownish yellow.

Head: Front subequal to width of eye, distinctly broader ventrally; first upper fronto-orbital one-third to one-half length of the second; gena one-sixth to one-fifth

height of eye. Antennae moderately separated at base; arista distinctly pubescent. Thorax: Mesonotum with 0 + 3 dorsocentrals, first dorsocentral one-third to two-thirds as long as second which is almost as far apart from transverse suture as from third, eight irregular rows of acrostichals, prescutellar seta one-fourth to one-half length of third dorsocentral, inner postalar one-fourth length of outer. Wing: Costa with sections 2 to 4 in proportion of 8: 2.5: 1.2, crossvein r-m beyond middle of discal cell (2.6: 1.8), ultimate section of M_{3+4} two-thirds length of penultimate. Terminalia: Surstylus with four spines, two of them slender; cercus twice as high as broad, bearing two or three long apical setae; phallus with a pair of spines at base; ejaculatory apodeme 212 μ long.

Length: Body 2.0-2.73 mm.; wing 1.84-2.28 mm.

Female. Color darker than in male; orangish spot on frontalia smaller, face pale brown, becoming yellowish dorsally or only parafacialia brownish ventrally, gena brown, darkened ventrally; antennal segment 3 with large brown apical spot covering most of inner ventral part; palpus yellowish brown. Thoracic pleura dark brown but pteropleuron, sternopleuron, and hypopleuron somewhat paler. Distal one-half to three-fourths of fore femur (except knee), distal three-fourths of mid and hind femora, and all tibiae (except distal apices) brown. Bristles on head and thorax brown to black. Ovipositor yellow.

Length: Body 2.5 mm.; wing 2.1-2.5 mm.

DISTRIBUTION: Solomons, New Hebrides, Fiji, N. Queensland, Caroline Is.

CAROLINE ATOLLS. KAPINGAMARANGI: Female (BISHOP), July-Aug. 1959, Wheeler and Wasserman.

TRUK. WENA (Moen): Male (US), 180 m., July, 1946, Townes.

The holotype is in the California Academy of Sciences. The junior author has examined the type and following material: Male, female, Florida I., Solomon Is., Mar. 1945, G. E. Bohart; male, Guadalcanal I., 1944, Berg; male, Segond Channel, Espiritu Santo, New Hebrides, July 1944, Laffoon; female, Oneata, Lau, Fiji Is., Aug. 1924, Bryan.